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ART UNIT	**PAPER NUMBER**
2123	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/836,281	RIESS ET AL.
	Examiner	Art Unit
	Kandasamy Thangavelu	2123

-- The MAILING DATE f this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 April 2001 and 16 July 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-57* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-42,44-46 and 48-57* is/are rejected.

7)☒ Claim(s) *43 and 47* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 April 2001 and 13 June 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-57 of the application have been examined.

Foreign Priority

2. Acknowledgment is made of applicant's claim for foreign priority based on application 9926167.9 filed on November 4, 9199 and 16938.3 filed on July 10, 2000 in UK and PCT applications 00/02648 and 00/02634 filed on July 10, 2000. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

3. Acknowledgment is made of the information disclosure statements filed on April 18, 2001, September 12, 2001, October 10, 2001, December 27, 2001 and December 13, 2002 together with copies of various papers. The patents and papers have been considered.

Drawings

4. The drawings submitted on April 18, 2001 and the drawing corrections proposed on June 13, 2001 are accepted.

Specification

5. The disclosure is objected to because of the following informalities:

Page 2, Line 3, "$a_{-K1}, \ldots a_{K2}$ represent the sampled values of the impulse response of the channel" appear to be incorrect and it appears that it should be "$x_{n-K1}, \ldots x_{n+K2}$ represent the sampled values of the impulse response of the channel".

Appropriate corrections are required.

Claim Objections

6. The following is a quotation of 37 C.F.R § 1.75 (d)(1):

> The claim or claims must conform to the invention as set forth in the remainder of the specification and terms and phrases in the claims must find clear support or antecedent basis in the description so that the meaning of the terms in the claims may be ascertainable by reference to the description.

7. Claims 45, 53 and 56 are objected to because of the following informalities:

Claim 45, Lines 1-2, "The receiver of claim 44, wherein the reliable symbol operates according to a method" appears to be incorrect and it appears that it should be "The receiver of claim 44, wherein the reliable symbol detector operates according to a method".

Claim 53, Lines 1-2, "A computer readable medium having stored thereon instructions that, when executed, cause a processor to:" appears to be incorrect and it appears that it should be "A computer readable medium having stored thereon

computer executable instructions that, when executed in a computer, cause a processor to:".

Claim 56, Lines 1-2, "A computer readable medium having stored thereon instructions that, when executed, cause a processor to:" appears to be incorrect and it appears that it should be "A computer readable medium having stored thereon computer executable instructions that, when executed in a computer, cause a processor to:".

Appropriate corrections are required.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claim 10-18, 50-52 and 54-55 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 10, Lines 1-4, recite the limitation " for a candidate sample y_n:

iteratively, for i= - K_1 to K_2, i#0:

adding to a reliability factor based on a value of the sample y_{n-i} ". The variables K_1 and K_2 are undefined, making the claim vague and indefinite.

Claim 15, Lines 1-2, recite the limitation " The method of claim 10, wherein the predetermined limit is $(K_1 + K_2)\ d_{min}$ ". The variables K_1 and K_2 are undefined, making the claim vague and indefinite.

Claim 50 recites the limitation " The method of claim 49" in Line 1 of the claim. There is insufficient antecedent basis for this limitation in the claim. Claim 49 refers to "A transmission system" and not a method.

Claim 51 recites the limitation " The method of claim 50" in Line 1 of the claim. There is insufficient antecedent basis for this limitation in the claim. Claim 49 on which claim 50 is based refers to "A transmission system" and not a method.

Claim 52 recites the limitation " The method of claim 49" in Line 1 of the claim. There is insufficient antecedent basis for this limitation in the claim. Claim 49 on which claim 50 is based refers to "A transmission system" and not a method.

Claim 54 recites the limitation " The method of claim 53" in Line 1 of the claim. There is insufficient antecedent basis for this limitation in the claim. Claim 53 refers to "A computer readable medium having stored thereon instructions" and not a method.

Claim 55 recites the limitation " The method of claim 53" in Line 1 of the claim. There is insufficient antecedent basis for this limitation in the claim. Claim 53 refers to "A computer readable medium having stored thereon instructions" and not a method.

Claim Rejections - 35 USC § 101

10. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

11. Claims 1-28 and 30-39 are rejected under 35 U.S.C. 101 because the claimed inventions are directed to non-statutory subject matter.

11.1 Method claims 1-9 are rejected for reciting a method that is not directed to the technological arts.

Regarding claim 1, this claim is directed at a reliable symbol identification method, whereas none of the limitations describe any type of computer-implemented steps. To be statutory, the utility of an invention must be within the technological arts. *In re Musgrave*, 167 USPQ 280, 289-90 (CCPA, 1970). The definition of "technology" is the "application of science and engineering to the development of machines and procedures in order to enhance or improve human conditions, or at least to improve human efficiency in some respect." (Computer Dictionary 384 (Microsoft Press, 2d ed. 1994)).

Dependent claims 2-9 depend on Claim 1 but do not add further statutory steps.

The limitations recited in claims 1-9 contain no language suggesting these claims are intended to be within the technological arts.

11.2 Method claims 10-18 are rejected for reciting a method that is not directed to the

technological arts.

Regarding claim 10, this claim is directed at a method of identifying reliable symbols, whereas none of the limitations describe any type of computer-implemented steps. To be statutory, the utility of an invention must be within the technological arts. See paragraph 11.1 above.

Dependent claims 11-18 depend on Claim 10 but do not add further statutory steps.

The limitations recited in claims 10-18 contain no language suggesting these claims are intended to be within the technological arts.

11.3 Method claims 19-28 are rejected for reciting a method that is not directed to the technological arts.

Regarding claim 19, this claim is directed at a method of identifying reliable symbols, whereas none of the limitations describe any type of computer-implemented steps. To be statutory, the utility of an invention must be within the technological arts. See paragraph 11.1 above.

Dependent claims 20-28 depend on Claim 19 but do not add further statutory steps.

The limitations recited in claims 19-28 contain no language suggesting these claims are intended to be within the technological arts.

11.4 Method claims 30-39 ejected for reciting a method that is not directed to the technological arts.

Regarding claim 30, this claim is directed at an equalization method, whereas none of the

limitations describe any type of computer-implemented steps. To be statutory, the utility of an invention must be within the technological arts. See paragraph 11.1 above.

Dependent claims 31-39 depend on Claim 30 but do not add further statutory steps.

The limitations recited in claims 30-39 contain no language suggesting these claims are intended to be within the technological arts.

12. Claim 1- 9 would be statutory if claim 1 is written as a computer implemented method for identification of a reliable symbol.

Claim 10- 18 would be statutory if claim 10 is written as a computer implemented method of identifying a reliable symbol.

Claim 19- 28 would be statutory if claim 19 is written as a computer implemented method of identifying a reliable symbol.

Claim 30- 39 would be statutory if claim 30 is written as a computer implemented method for equalization of captured samples.

Claim Rejections - 35 USC § 102

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in-
> (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

> (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

14. Claims 1 and 53 are rejected under 35 U.S.C. § 102(e) as being anticipated by **Hassan** (U.S. Patent 6,581,179).

14.1 **Hassan** teaches methods for generating side information in the presence of time-selective fading. Specifically, as per claim 1, **Hassan** teaches a reliable symbol identification method (Abstract, L1-8; CL2, L44-59); comprising:

calculating a reliability factor of a candidate sample from values of a plurality of samples in proximity to the candidate sample (Abstract, L1-8; CL2, L44-59);

if the reliability factor is less than a predetermined limit, designating the candidate sample as a reliable symbol (CL2, L27-36; CL3, L45-54).

14.2 As per Claim 53, it is rejected based on the same reasoning as Claim 1, supra. Claim 53 is a computer readable medium claim reciting the same limitations as Claim 1, as taught throughout by **Hassan.**

15. Claims 29, 30, 38, 40, 56 and 57 are rejected under 35 U.S.C. § 102(e) as being anticipated by **Agazzi et al.** (U.S. Patent 5,889,823).

15.1 As per claim 29, **Agazzi et al.** teaches a data decoder (Abstract, L1-3; CL1, L9-12); comprising:

a reliable symbol detector to detect reliable symbols from a sequence of captured samples (CL2, L19-25); the captured samples having been corrupted by at least intersymbol interference ("ISI") (CL2, L62 to CL3, L);

an adaptation unit coupled to the reliable symbol detector to generate ISI metrics based on the reliable symbols (CL6, L34-37; CL6, L59-61); and

a data decoder to receive the captured samples and estimate source symbols based on the ISI metrics (CL4, L53-54; CL4, L63 to CL5, L12).

15.2 As per claim 30, **Agazzi et al.** teaches an equalization method (CL6, L34-37; CL6, L59-61; CL3, L6-8); comprising;

identifying reliable symbols from a string of captured samples (CL2, L19-25);

calculating channel effects based on the reliable symbols and samples adjacent thereto (CL8, L25-31; CL8, L36-57);

correcting the captured samples based on the channel effects (CL3, L6-8; CL8, L25-31; CL8, L36-57).

15.3 As per claim 38, **Agazzi et al.** teaches the method of claim 30. **Agazzi et al.** teaches wherein the calculating estimates K channel coefficients a_i according to a least squared error analysis of y_{RS} - $\hat{x}_n$ - $\sum_{i=1}^{k} \hat{a}_i \hat{x}_{n-i}$, solving for $\hat{a}_i$ for a plurality of reliable symbols y_{RS}, where $\hat{x}_n$ and $\hat{x}_{n-i}$ are estimated transmitted symbols (CL8, L25-27; CL8 L27-57);

15.4 As per claim 40, **Agazzi et al.** teaches an equalizer, comprising a buffer memory (CL6, L34-37; CL6, L59-61; CL3, L6-8; CL4, L53-54);

a reliable symbol detector in communication with the buffer memory (CL2, L19-25);

an adaptation unit in communication with the reliable symbol detector (CL6, L34-37; CL6, L59-61); and

a symbol decoder in communication with the adaptation unit and the buffer memory (CL4, L53-54; CL4, L63 to CL5, L12).

15.5 As per Claim 56, it is rejected based on the same reasoning as Claim 30, supra. Claim 56 is a computer readable medium claim reciting the same limitations as Claim 30, as taught throughout by **Agazzi et al.**

15.6 As per claim 57, **Agazzi et al.** teaches a data signal, generated according to the process (CL5, L21-23); of

identifying reliable symbols from a string of captured samples (CL2, L19-25);

calculating channel effects based on the reliable symbols and samples adjacent thereto (CL8, L25-31; CL8, L36-57);

estimating transmitted symbols from remaining captured samples based on the channel effects (CL3, L6-8; CL8, L25-31; CL8, L36-57); and

outputting the estimated symbols as the data signal (CL5, L21-23).

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

17. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

18. Claims 2-5, 10-12 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Hassan** (U.S. Patent 6,581,179) in view of **Dent** (U.S. Patent 6,556,634).

18.1 As per claims 2-5, **Hassan** teaches the method of claim 1. **Hassan** does not expressly teach that the reliability factor Rn of the candidate sample is given by:

$R_n = \sum_{i=-k1,\, i \neq 0}^{k2} | y_{n-i} | c_i$, where

y_n, is the candidate sample,

y_{n-i} is a sample in proximity to the candidate sample,

K_1, K_2 are numbers of samples adjacent to the candidate sample, and

c_i is a coefficient ; where $c_i = 1$ for all i; wherein $K_1 = 0$; and wherein $K_2 = 0$. **Dent** teaches that the reliability factor Rn of the candidate sample is given by:

$R_n = \sum_{i=-k1, i \neq 0}^{k2} | y_{n-i} | c_i$, where

y_n, is the candidate sample,

y_{n-i} is a sample in proximity to the candidate sample,

K_1, K_2 are numbers of samples adjacent to the candidate sample, and

c_i is a coefficient; where $c_i = 1$ for all i; wherein $K_1 = 0$; and wherein $K_2 = 0$ (CL1, L31-44; CL3, L4-9; CL4, L56-63; CL17, L54 to CL18, L50), because the multi-path signals when added together increase the signal strength, thus raising the quality of received signal (CL1, L31-34); processing the gain of combined multi-path signals suppresses interference between multiple paths (CL1, L43-44); and the accumulation method compensates for the intersymbol interference (CL4, L10-11). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the method of **Hassan** with the method of **Dent** that included the reliability factor Rn of the candidate sample being given by:

$R_n = \sum_{i=-k1, i \neq 0}^{k2} | y_{n-i} | c_i$, where

y_n, was the candidate sample,

y_{n-i} was a sample in proximity to the candidate sample,

K_1, K_2 were numbers of samples adjacent to the candidate sample, and

c_i was a coefficient; where $c_i = 1$ for all i; wherein $K_1 = 0$; and wherein $K_2 = 0$. The artisan would have been motivated because the multi-path signals when added together would increase the signal strength, thus raising the quality of received signal; processing the gain of combined

multi-path signals would suppress interference between multiple paths; and the accumulation method would compensate for the intersymbol interference.

18.2 As per claims 10-12, **Hassan** teaches method of identifying reliable symbols(Abstract; L1-8; CL2, L44-59); comprising:

for a candidate sample y_n:

iteratively, for i= - K_1 to K_2, i#0:

if the reliability factor exceeds a predetermined limit, disqualifying the candidate sample as a reliable symbol (CL2, L27-36; CL3, L45-54); and

otherwise, incrementing i and, if i=0, re-incrementing i for a subsequent iteration; thereafter, unless the candidate symbol has been disqualified, designating the candidate sample as a reliable symbol (CL2, L27-36; CL3, L45-54).

Hassan does not expressly teach that adding to a reliability factor based on a value of the sample y_{n-I}; the adding adds an absolute value of the sample y_{n-i} to the reliability factor; and the adding adds a scaled value of the sample y_{n-i} to the reliability factor, the value scaled in accordance with a predetermined coefficient c_i. **Dent** teaches that adding to a reliability factor based on a value of the sample y_{n-I}; the adding adds an absolute value of the sample y_{n-i} to the reliability factor; and the adding adds a scaled value of the sample y_{n-i} to the reliability factor, the value scaled in accordance with a predetermined coefficient c_i (CL1, L31-44; CL3, L4-9; CL4, L56-63; CL17, L54 to CL18, L50), because the multi-path signals when added together increase the signal strength, thus raising the quality of received signal (CL1, L31-34); processing the gain

of combined multi-path signals suppresses interference between multiple paths (CL1, L43-44); the accumulation method compensates for the intersymbol interference (CL4, L10-11); and the weighting may assign lower weight to older symbols and a higher weight to more recent symbols (CL4, L59-61). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the method of **Hassan** with the method of **Dent** that included adding to a reliability factor based on a value of the sample y_{n-I}; the adding of an absolute value of the sample y_{n-i} to the reliability factor; and the adding of a scaled value of the sample y_{n-i} to the reliability factor, the value scaled in accordance with a predetermined coefficient c_i. The artisan would have been motivated because the multi-path signals when added together would increase the signal strength, thus raising the quality of received signal; processing the gain of combined multi-path signals would suppress interference between multiple paths; the accumulation method would compensate for the intersymbol interference; and the weighting might assign lower weight to older symbols and a higher weight to more recent symbols.

18.3 As per Claim 54, it is rejected based on the same reasoning as Claim 2, supra. Claim 54 is a computer readable medium claim reciting the same limitations as Claim 2, as taught throughout by **Hassan** and **Dent.**

19. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Hassan** (U.S. Patent 6,581,179) in view of **Bottomley et al.** (U.S. Patent 6,570,910).

19.1 As per claim 6, **Hassan** teaches the method of claim 1. **Hassan** does not expressly teach that the predetermined threshold varies over time. **Bottomley et al.** teaches that predetermined threshold varies over time (CL1, L67 to CL2, L1), because modifications occur to the received signal during transmission; and the modifications need to be tracked with time (CL1, L65 to CL2, L1). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the method of **Hassan** with the method of **Bottomley et al.** that included predetermined threshold varying over time. The artisan would have been motivated because modifications would occur to the received signal during transmission; and the modifications need to be tracked with time.

20. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Hassan** (U.S. Patent 6,581,179) in view of **Dent** (U.S. Patent 6,556,634), and further in view of **Isaksson et al.** (U.S. Patent 6,438,174).

20.1 As per claims 14-15, **Hassan** and **Dent** teach the method of claim 10. **Hassan** does not expressly teach that the predetermined limit is half a width of an annular constellation ring in which the candidate sample is observed; and the predetermined limit is $(K_1 + K_2)\ d_{min}$, where d_{min} is half a distance between two constellation points that are closest together in a governing constellation. **Isaksson et al.** teaches that the predetermined limit is half a width of an annular constellation ring in which the candidate sample is observed; and the predetermined limit is $(K_1 + K_2)\ d_{min}$, where d_{min} is half a distance between two constellation points that are closest together in a governing constellation (CL2, L31-39; CL2, L44-48; CL2, L49-51; CL20, L53-57), because

performance can be optimized by carefully setting the signal level at the receiver ADC; and this handles problems associated with inter-symbol interference caused by time dispersion (CL11, L29-33). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the method of **Hassan** with the method of **Isaksson et al.** that included the predetermined limit is half a width of an annular constellation ring in which the candidate sample is observed; and the predetermined limit is $(K_1 + K_2)$ $d_{min,}$ where d_{min} is half a distance between two constellation points that are closest together in a governing constellation. The artisan would have been motivated because performance could be optimized by carefully setting the signal level at the receiver ADC; and this would handle problems associated with inter-symbol interference caused by time dispersion.

21. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Hassan** (U.S. Patent 6,581,179) in view of **Dent** (U.S. Patent 6,556,634), and further in view of **Bottomley et al.** (U.S. Patent 6,570,910).

21.1 As per claim 16, **Hassan** and **Dent** teach the method of claim 10. **Hassan** does not expressly teach that the predetermined threshold varies over time. **Bottomley et al.** teaches that predetermined threshold varies over time (CL1, L67 to CL2, L1). The motivation for combining the method of **Hassan** with the method of **Bottomley et al.** is presented in Paragraph 19.1 above.

22. Claims 19 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Dent** (U.S. Patent 6,556,634) in view of **Verma** (U.S. Patent 6,757,299).

22.1 As per claim 19, **Dent** teaches a method of identifying reliable symbols (CL3, L20-24; CL3, L30-31); comprising:

for a candidate sample, if none of the values exceed the threshold, designating the candidate sample as a reliable symbol (CL1, L31-44).

Dent does not expressly teach determining whether any of a plurality of neighboring sample values is within a predetermined limit. **Verma** teaches determining whether any of a plurality of neighboring sample values is within a predetermined limit (CL1, L67 to CL2, L1), because the predetermined limit is used for determining if average power ratio reduction should be applied (CL3, L28-30). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the method of **Dent** with the method of **Verma** that included determining whether any of a plurality of neighboring sample values is within a predetermined limit. The artisan would have been motivated because the predetermined limit would be used for determining if average power ratio reduction should be applied.

22.2 As per claim 25, **Dent** teaches a reliable symbol detection method (CL3, L20-24; CL3, L30-31); comprising:

designating a sample adjacent to the sequence as a reliable symbol (CL1, L31-44).

Dent does not expressly teach identifying a sequence of signal values having values within a predetermined limit. **Verma** teaches identifying a sequence of signal values having

values within a predetermined limit (CL1, L67 to CL2, L1), because the predetermined limit is used for determining if average power ratio reduction should be applied (CL3, L28-30). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the method of **Dent** with the method of **Verma** that included identifying a sequence of signal values having values within a predetermined limit. The artisan would have been motivated because the predetermined limit would be used for determining if average power ratio reduction should be applied.

23. Claims 20 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Dent** (U.S. Patent 6,556,634) in view of **Verma** (U.S. Patent 6,757,299), and further in view of **Bottomley et al.** (U.S. Patent 6,570,910).

23.1 As per claim 20, **Dent** and **Verma** teach the method of claim 19. **Dent** does not expressly teach that the predetermined threshold varies over time. **Bottomley et al.** teaches that predetermined threshold varies over time (CL1, L67 to CL2, L1), because modifications occur to the received signal during transmission; and the modifications need to be tracked with time (CL1, L65 to CL2, L1). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the method of **Dent** with the method of **Bottomley et al.** that included predetermined threshold varying over time. The artisan would have been motivated because modifications would occur to the received signal during transmission; and the modifications need to be tracked with time.

23.2 As per claim 26, **Dent** and **Verma** teach the method of claim 25. **Dent** does not expressly teach that the predetermined threshold varies over time. **Bottomley et al.** teaches that predetermined threshold varies over time (CL1, L67 to CL2, L1). The motivation for combining the method of **Dent** with the method of **Bottomley et al.** is presented in Paragraph 23.1 above.

24. Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Dent** (U.S. Patent 6,556,634) in view of **Verma** (U.S. Patent 6,757,299), and further in view of **Temerinac** (U.S. Patent 6,477,215).

24.1 As per claims 23 and 24, **Dent** and **Verma** teach the method of claim 19. **Dent** does not expressly teach that the neighboring samples occur in a first window adjacent to the candidate sample on one side of the candidate sample; and the neighboring symbols occur in a pair of windows that are adjacent to, and on either side of the candidate sample. **Temerinac** teaches that the neighboring samples occur in a first window adjacent to the candidate sample on one side of the candidate sample; and the neighboring symbols occur in a pair of windows that are adjacent to, and on either side of the candidate sample (CL4, L21-24), because information on the respective symbols can be evaluated without interference from neighboring symbols at the symbol sampling instants; and the farther the current symbol sampling instant is away from the neighboring optimum sampling instants, the greater the intersymbol interference (CL7, L12-17). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the method of **Dent** with the method of **Temerinac** that included the neighboring samples occurring in a first window adjacent to the candidate sample on one side of the

candidate sample; and the neighboring symbols occurring in a pair of windows that would be adjacent to, and on either side of the candidate sample. The artisan would have been motivated because information on the respective symbols could be evaluated without interference from neighboring symbols at the symbol sampling instants; and the farther the current symbol sampling instant was away from the neighboring optimum sampling instants, the greater the intersymbol interference.

25. Claims 31 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Agazzi et al.** (U.S. Patent 5,889,823) in view of **Hassan** (U.S. Patent 6,581,179).

25.1 As per claim 31, **Agazzi et al.** teaches the method of claim 30. **Agazzi et al.** does not expressly teach calculating a reliability factor of a candidate sample from values of a plurality of samples in the neighborhood of the candidate sample; and if the reliability factor is below a predetermined limit, designating the candidate sample as a reliable symbol. **Hassan** teaches calculating a reliability factor of a candidate sample from values of a plurality of samples in the neighborhood of the candidate sample(Abstract, L1-8; CL2, L44-59); and if the reliability factor is below a predetermined limit, designating the candidate sample as a reliable symbol (CL2, L27-36; CL3, L45-54), because that provides significant enhancement in system performance in terms of signal-to-noise ratio (CL2, L59-61). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the method of **Agazzi et al.** with the method of **Hassan** that included calculating a reliability factor of a candidate sample from values of a plurality of samples in the neighborhood of the candidate sample; and if the reliability factor

is below a predetermined limit, designating the candidate sample as a reliable symbol. The artisan would have been motivated because that provides significant enhancement in system performance in terms of signal-to-noise ratio.

25.2 As per claim 41, **Agazzi et al.** teaches the equalizer of claim 40. **Agazzi et al.** does not expressly teach the reliable symbol operates according to a method, comprising calculating a reliability factor of a candidate sample from values of a plurality of samples in the neighborhood of the candidate sample; and if the reliability factor is below a predetermined limit, designating the candidate sample as a reliable symbol. **Hassan** teaches the reliable symbol operates according to a method, comprising calculating a reliability factor of a candidate sample from values of a plurality of samples in the neighborhood of the candidate sample (Abstract, L1-8; CL2, L44-59); and if the reliability factor is below a predetermined limit, designating the candidate sample as a reliable symbol (CL2, L27-36; CL3, L45-54). The motivation for modifying the equalizer of **Agazzi et al.** with the method of **Hassan** is presented in Paragraph 25.1 above.

26. Claims 32, 33 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Agazzi et al.** (U.S. Patent 5,889,823) in view of **Hassan** (U.S. Patent 6,581,179), and further in view of **Dent** (U.S. Patent 6,556,634).

26.1 As per claim 32, **Agazzi et al.** and **Hassan** teach the method of claim 31. **Agazzi et al.** does not expressly teach that the reliability factor Rn of the candidate sample is given by:

$R_n = \sum_{i=-k1, i \neq 0}^{k2} | y_{n-i} | c_i$, where

y_{n-i} is a sample in proximity to the candidate sample,

K_1, K_2 are numbers of samples adjacent to the candidate sample, and

c_i is a coefficient. **Dent** teaches that the reliability factor Rn of the candidate sample is given by:

$R_n = \sum_{i=-k1, i \neq 0}^{k2} | y_{n-i} | c_i$, where

y_{n-i} is a sample in proximity to the candidate sample,

K_1, K_2 are numbers of samples adjacent to the candidate sample, and

c_i is a coefficient (CL1, L31-44; CL3, L4-9; CL4, L56-63; CL17, L54 to CL18, L50), because the multi-path signals when added together increase the signal strength, thus raising the quality of received signal (CL1, L31-34); processing the gain of combined multi-path signals suppresses interference between multiple paths (CL1, L43-44); and the accumulation method compensates for the intersymbol interference (CL4, L10-11). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the method of **Agazzi et al.** with the method of **Dent** that included the reliability factor Rn of the candidate sample being given by:

$R_n = \sum_{i=-k1, i \neq 0}^{k2} | y_{n-i} | c_i$, where

y_{n-i} was a sample in proximity to the candidate sample,

K_1, K_2 were numbers of samples adjacent to the candidate sample, and

c_i was a coefficient. The artisan would have been motivated because the multi-path signals when added together would increase the signal strength, thus raising the quality of received signal; processing the gain of combined multi-path signals would suppress interference between multiple paths; and the accumulation method would compensate for the intersymbol interference.

26.2 As per claim 33, **Agazzi et al.** and **Hassan** teach the method of claim 31. **Agazzi et al.** does not expressly teach that the reliability factor Rn of the candidate sample is given by:

$R_n = \sum_{i=1}^{k} | y_{n-i} | c_i$, where

y_{n-i} is a sample in the neighborhood of the candidate sample,

K is a length of samples, and

c_i is a coefficient. **Dent** teaches that the reliability factor Rn of the candidate sample is given by:

$R_n = \sum_{i=1}^{k} | y_{n-i} | c_i$, where

y_{n-i} is a sample in the neighborhood of the candidate sample,

K is a length of samples, and

c_i is a coefficient (CL1, L31-44; CL3, L4-9; CL4, L56-63; CL17, L54 to CL18, L50), because the multi-path signals when added together increase the signal strength, thus raising the quality of received signal (CL1, L31-34); processing the gain of combined multi-path signals suppresses interference between multiple paths (CL1, L43-44); and the accumulation method compensates for the intersymbol interference (CL4, L10-11). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the method of **Agazzi et al.** with the method of **Dent** that included the reliability factor Rn of the candidate sample being given by:

$R_n = \sum_{i=1}^{k} | y_{n-i} | c_i$, where

y_{n-i} is a sample in the neighborhood of the candidate sample,

K is a length of samples, and

c_i was a coefficient. The artisan would have been motivated because the multi-path signals when added together would increase the signal strength, thus raising the quality of received

signal; processing the gain of combined multi-path signals would suppress interference between multiple paths; and the accumulation method would compensate for the intersymbol interference.

26.3 As per claim 42, **Agazzi et al.** and **Hassan** teach the equalizer of claim 41. **Agazzi et al.** does not expressly teach that the reliability factor Rn of the candidate sample is given by:

$R_n = \sum_{i=-k1, i \neq 0}^{k2} | y_{n-i} | c_i$, where

y_{n-i} is a sample in proximity to the candidate sample,

K_1, K_2 are numbers of samples adjacent to the candidate sample, and

c_i is a coefficient. **Dent** teaches that the reliability factor Rn of the candidate sample is given by:

$R_n = \sum_{i=-k1, i \neq 0}^{k2} | y_{n-i} | c_i$, where

y_{n-i} is a sample in proximity to the candidate sample,

K_1, K_2 are numbers of samples adjacent to the candidate sample, and

c_i is a coefficient (CL1, L31-44; CL3, L4-9; CL4, L56-63; CL17, L54 to CL18, L50). The motivation for modifying the equalizer of **Agazzi et al.** with the method of **Dent** is presented in Paragraph 26.1 above.

27. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Agazzi et al.** (U.S. Patent 5,889,823) in view of **Dent** (U.S. Patent 6,556,634), and further in view of **Verma** (U.S. Patent 6,757,299).

27.1 As per claim 35, **Agazzi et al.** teaches the method of claim 30. **Agazzi et al.** does not expressly teach identifying a sequence of samples having received signal magnitude levels below

a predetermined limit. **Verma** teaches identifying a sequence of samples having received signal magnitude levels below a predetermined limit (CL1, L67 to CL2, L1), because the predetermined limit is used for determining if average power ratio reduction should be applied (CL3, L28-30). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the method of **Agazzi et al.** with the method of **Verma** that included identifying a sequence of samples having received signal magnitude levels below a predetermined limit. The artisan would have been motivated because the predetermined limit would be used for determining if average power ratio reduction should be applied.

Agazzi et al. does not expressly teach designating a sample adjacent to the sequence as a reliable symbol. **Dent** teaches designating a sample adjacent to the sequence as a reliable symbol (CL1, L31-44), because the processing gain of the multi-path signals allows suppressing interference between multiple paths (CL1, L43-44). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the method of **Agazzi et al.** with the method of **Dent** that included designating a sample adjacent to the sequence as a reliable symbol. The artisan would have been motivated because the processing gain of the multi-path signals would allow suppressing interference between multiple paths.

28. Claims 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Agazzi et al.** (U.S. Patent 5,889,823) in view of **Temerinac** (U.S. Patent 6,477,215).

28.1 As per claim 36, **Agazzi et al.** teaches the method of claim 30. **Agazzi et al.** does not expressly teach for QAM transmission, the identifying comprises identifying a sequence of

samples for which a received signal magnitude in a quadrature-phase component is below a predetermined limit. **Temerinac** teaches for QAM transmission, the identifying comprises identifying a sequence of samples for which a received signal magnitude in a quadrature-phase component is below a predetermined limit (CL6, L32-41), because the measured phase and amplitude error values represent a measure of respective reliability; smaller the error values, greater the reliability (CL3, L17-19). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the method of **Agazzi et al.** with the method of **Temerinac** that included for QAM transmission, the identifying comprising identifying a sequence of samples for which a received signal magnitude in a quadrature-phase component was below a predetermined limit. The artisan would have been motivated because the measured phase and amplitude error values would represent a measure of respective reliability; smaller the error values, greater the reliability.

Agazzi et al. does not expressly teach designating an adjacent sample as a reliable symbol for quadrature-phase. **Temerinac** teaches designating an adjacent sample as a reliable symbol for quadrature-phase (CL3, L17-26), because the measured phase and amplitude error values represent a measure of respective reliability; smaller the error values, greater the reliability (CL3, L17-19). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the method of **Agazzi et al.** with the method of **Temerinac** that included designating an adjacent sample as a reliable symbol for quadrature-phase. The artisan would have been motivated because the measured phase and amplitude error values would represent a measure of respective reliability; smaller the error values, greater the reliability.

28.2 As per claim 37, **Agazzi et al.** teaches the method of claim 30. **Agazzi et al.** does not expressly teach for QAM transmission, the identifying comprises identifying a sequence of samples for which a received signal magnitude in an in-phase component is below a predetermined limit. **Temerinac** teaches for QAM transmission, the identifying comprises identifying a sequence of samples for which a received signal magnitude in an in-phase component is below a predetermined limit (CL6, L32-41), because the measured phase and amplitude error values represent a measure of respective reliability; smaller the error values, greater the reliability (CL3, L17-19). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the method of **Agazzi et al.** with the method of **Temerinac** that included for QAM transmission, the identifying comprising identifying a sequence of samples for which a received signal magnitude in an in-phase component was below a predetermined limit. The artisan would have been motivated because the measured phase and amplitude error values would represent a measure of respective reliability; smaller the error values, greater the reliability.

Agazzi et al. does not expressly teach designating an adjacent sample as a reliable symbol for in-phase. **Temerinac** teaches designating an adjacent sample as a reliable symbol for in-phase (CL3, L17-26), because the measured phase and amplitude error values represent a measure of respective reliability; smaller the error values, greater the reliability (CL3, L17-19). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the method of **Agazzi et al.** with the method of **Temerinac** that included designating an adjacent sample as a reliable symbol for in-phase. The artisan would have been motivated

because the measured phase and amplitude error values would represent a measure of respective reliability; smaller the error values, greater the reliability.

29. Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Agazzi et al.** (U.S. Patent 5,889,823) in view of **Sakoda et al.** (U.S. Patent 6,590,860).

29.1 As per claim 39, **Agazzi et al.** teaches the method of claim 30. **Agazzi et al.** does not expressly teach the method further comprising assigning weights among the reliable symbols based upon respective reliability factors. **Sakoda et al.** teaches the method further comprising assigning weights among the reliable symbols based upon respective reliability factors (Abstract, L6-10; CL4, L4-7), because that facilitates the transmitted data to be restored with further improved accuracy by conducting a high precision maximum likelihood sequence estimation (Abstract, L17-19). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the method of **Agazzi et al.** with the method of **Sakoda et al.** that included the method further comprising assigning weights among the reliable symbols based upon respective reliability factors. The artisan would have been motivated because that would facilitate the transmitted data to be restored with further improved accuracy by conducting a high precision maximum likelihood sequence estimation.

30. Claims 44, 45 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Hassan** (U.S. Patent 6,581,179) in view of **Agazzi et al.** (U.S. Patent 5,889,823).

30.1 As per Claims 44 and 48, **Hassan** teaches a receiver, comprising a demodulator (CL3, L24-26; Fig 1; Fig 3); a detector and a symbol decoder (CL3, L24-26; Fig 1; Fig 3).

Hassan does not expressly teach a buffer memory in communication with the demodulator, a processor in communication with the demodulator, executing instructions that establish the logical structures for a reliable symbol detector in communication with the buffer memory; an adaptation unit in communication with the reliable symbol detector; a symbol decoder unit in communication with the adaptation unit and the buffer memory; a source decoder in communication with the equalizer; and a second buffer memory in communication with the symbol decoder. **Agazzi et al.** teaches a buffer memory in communication with the demodulator (CL4, L53-54); a processor in communication with the demodulator, executing instructions that establish the logical structures (CL4, L53-54), for a reliable symbol detector in communication with the buffer memory (CL2, L19-25); an adaptation unit in communication with the reliable symbol detector (CL6, L34-37; CL6, L59-61); and a symbol decoder unit in communication with the adaptation unit and the buffer memory (CL4, L53-54; CL4, L63 to CL5, L12); and a source decoder in communication with the equalizer (Abstract, L1-3); and a second buffer memory in communication with the symbol decoder (CL4, L53-54), because such an apparatus is typical standard implementation of a digital signal receiver for minimizing intersymbol interference (Fig 1;CL6, L3-61). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the receiver of **Hassan** with the receiver of **Agazzi et al.** that included a buffer memory in communication with the demodulator, a processor in communication with the demodulator, executing instructions that establish the logical structures

for a reliable symbol detector in communication with the buffer memory; an adaptation unit in communication with the reliable symbol detector; and a symbol decoder unit in communication with the adaptation unit and the buffer memory; and a source decoder in communication with the equalizer; and a second buffer memory in communication with the symbol decoder. The artisan would have been motivated because such an apparatus is typical standard implementation of a digital signal receiver for minimizing intersymbol interference.

30.2 As per claim 45, **Hassan** and **Agazzi et al.** teach the receiver of claim 44. **Hassan** teaches the reliable symbol operates according to a method comprising:

calculating a reliability factor of a candidate sample from values of a plurality of samples in proximity to the candidate sample (Abstract, L1-8; CL2, L44-59);

if the reliability factor is less than a predetermined limit, designating the candidate sample as a reliable symbol (CL2, L27-36; CL3, L45-54).

31. Claim 46 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Hassan** (U.S. Patent 6,581,179) in view of **Agazzi et al.** (U.S. Patent 5,889,823), and further in view of **Dent** (U.S. Patent 6,556,634).

31.1 As per claim 46, **Hassan** and **Agazzi et al.** teach the receiver of claim 45. **Hassan** does not expressly teach that the reliability factor Rn of the candidate sample is given by:

$R_n = \sum_{i=-k1, i \neq 0}^{k2} | y_{n-i} | c_i$, where

y_{n-i} is a sample in proximity to the candidate sample,

K_1, K_2 are numbers of samples adjacent to the candidate sample, and

c_i is a coefficient. **Dent** teaches that the reliability factor Rn of the candidate sample is given by:

$R_n = \sum_{i=-k1,\, i\neq 0}^{k2} | y_{n-i} | c_i$, where

y_{n-i} is a sample in proximity to the candidate sample,

K_1, K_2 are numbers of samples adjacent to the candidate sample, and

c_i is a coefficient (CL1, L31-44; CL3, L4-9; CL4, L56-63; CL17, L54 to CL18, L50). The motivation for modifying the equalizer of **Hassan** with the method of **Dent** is presented in Paragraph 18.1 above.

32. Claims 49 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Hassan** (U.S. Patent 6,581,179) in view of **Isaksson et al.** (U.S. Patent 6,438,174), and further in view of **Agazzi et al.** (U.S. Patent 5,889,823).

32.1 As per Claim 49, **Hassan** teaches a transmission system comprising a source that transmits data encoded as symbols (CL3, L17-26; Fig 1; Fig 3).

Hassan does not expressly teach the symbols being selected from a high-order constellation. **Isaksson et al.** teaches the symbols being selected from a high-order constellation (Abstract, L2-4), because that permits transmission of multiple bits per carrier and symbol (Abstract, L2-4). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the transmission system of **Hassan** with the transmission system of **Isaksson et al.** that included the symbols being selected from a high-order constellation. The

artisan would have been motivated because that would permit transmission of multiple bits per carrier and symbol.

Hassan does not expressly teach a destination that captures a signal representing the transmitted symbols having been corrupted by at least intersymbol interference; the destination identifying reliable symbols from the captured samples; calculating channel effects based on the reliable symbols and samples proximate thereto; correcting other captured samples based on the channel effects. **Agazzi et al.** teaches a destination that captures a signal representing the transmitted symbols having been corrupted by at least intersymbol interference (CL2, L62 to CL3, L); the destination identifying reliable symbols from the captured samples (CL2, L19-25); calculating channel effects based on the reliable symbols and samples proximate thereto (CL8, L25-31; CL8, L36-57); correcting the captured samples based on the channel effects (CL3, L6-8; CL8, L25-31; CL8, L36-57), because these are components of the method and apparatus to compensate for linear and non-linear intersymbol interference (CL4, L53-54). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the transmission system of **Hassan** with the transmission system of **Agazzi et al.** that included a destination that captures a signal representing the transmitted symbols having been corrupted by at least intersymbol interference; the destination identifying reliable symbols from the captured samples; calculating channel effects based on the reliable symbols and samples proximate thereto; correcting other captured samples based on the channel effects. The artisan would have been motivated because these would be the components of the method and apparatus to compensate for linear and non-linear intersymbol interference.

32.2 As per claim 50, **Hassan, Isaksson et al.** and **Agazzi et al.** teach the transmission system of claim 49. **Hassan** teaches the reliable symbol operates according to a method comprising:

calculating a reliability factor of a candidate sample from values of a plurality of samples in proximity to the candidate sample (Abstract, L1-8; CL2, L44-59);

if the reliability factor is less than a predetermined limit, designating the candidate sample as a reliable symbol (CL2, L27-36; CL3, L45-54).

33. Claim 51 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Hassan** (U.S. Patent 6,581,179) in view of **Isaksson et al.** (U.S. Patent 6,438,174), and further in view of **Agazzi et al.** (U.S. Patent 5,889,823) and **Dent** (U.S. Patent 6,556,634).

33.1 As per claim 51, **Hassan Isaksson et al.** and **Agazzi et al.** teach the transmission system of claim 50. **Hassan** does not expressly teach that the reliability factor Rn of the candidate sample is given by:

$R_n = \sum_{i=-k1,\, i\neq 0}^{k2} | y_{n-i} | c_i$, where

y_{n-i} is a sample in proximity to the candidate sample,

K_1, K_2 are numbers of samples adjacent to the candidate sample, and

c_i is a coefficient. **Dent** teaches that the reliability factor Rn of the candidate sample is given by:

$R_n = \sum_{i=-k1,\, i\neq 0}^{k2} | y_{n-i} | c_i$, where

y_{n-i} is a sample in proximity to the candidate sample,

K_1, K_2 are numbers of samples adjacent to the candidate sample, and

c_i is a coefficient (CL1, L31-44; CL3, L4-9; CL4, L56-63; CL17, L54 to CL18, L50). The motivation for modifying the equalizer of **Hassan** with the method of **Dent** is presented in Paragraph 18.1 above.

Allowable Subject Matter

34. Claims 43 and 47 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

35. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kandasamy Thangavelu whose telephone number is 571-272-3717. The examiner can normally be reached on Monday through Friday from 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin Teska, can be reached on 571-272-3716. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-9600.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

K. Thangavelu
Art Unit 2123
December 15, 2004

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